VIA ELECTRONIC FILING

DECLARATION UNDER 37 C.F.R. §1.131 Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	Application Number	10/809,981
	Attorney Docket Number	10030938-1
	Filing Date	March 26, 2004
	First Named Inventor	David R. Adaskin
	Examiner	Brian R. Gordon
	Group Art	1797
	Title: GENERALIZED PULSE JET EJECTION HEAD CONTROL	

This Declaration under 37 C.F.R. § 1.131 and the attached Exhibit are submitted with Applicants' Response to the Office Action dated April 1, 2008.

We, David R. Adaskin, Bill J. Peck, Stanley P. Woods, and William G. Chesk do hereby declare as follows.

1. We are the inventors of the invention claimed in the above captioned application.

2. We have been asked to declare and provide factual evidence in support of conception and reduction to practice of the claimed invention described in the above captioned application before July 31, 2003.

3. Exhibit A consists of a photocopy of the Invention Disclosure (total of 6 pages). In Exhibit A, all of the dates have been redacted but are prior to July 31, 2003.

4. Exhibit A describes a method of preparing an array production system for operation by entering printhead data and configuring a printhead control routine. See for instance, page 4.

5. The evidence provided in Exhibit A establishes that we conceived the design for the claimed invention of the above captioned application and reduced it to practice prior to July 31, 2003.

6. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

Respectfully submitted,

Date: _____ _____

David R. Adaskin

Date: _____ _____

Bill J. Peck

Date: _____ _____

Stanley P. Woods

Date: _____ _____

William G. Chesk

Attachment: Exhibit A

5. The evidence provided in Exhibit A establishes that we conceived the design for the claimed invention of the above captioned application and reduced it to practice prior to July 31, 2003.

6. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

Respectfully submitted,

Date: _____

_____
David R. Adaskin

Date: _____

_____
Bill J. Peck

Date: June 30, 2008

Stanley P. Woods
Stanley P. Woods

Date: _____

_____
William G. Chesk

Attachment: Exhibit A

5. The evidence provided in Exhibit A establishes that we conceived the design for the claimed invention of the above captioned application and reduced it to practice prior to July 31, 2003.

6. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

Respectfully submitted,

Date: _____ _____

David R. Adaskin

Date: _____ _____

Bill J. Peck

Date: _____ _____

Stanley P. Woods

Date: 6/29/08 William G Chesk

William G. Chesk

Attachment: Exhibit A

Exhibit A

Agilent Technologies

INVENTION DISCLOSURE

PAGE ONE OF 6

PDNO 10030938 DATE RCVD [redacted] ATTORNEY GMS/BRS

*Instructions: The information contained in this document is **COMPANY CONFIDENTIAL** and may not be disclosed to others without prior authorization. Submit this disclosure to the Agilent Technologies Legal Department as soon as possible. No patent protection is possible until a patent application is authorized, prepared, and submitted to the Government.*

Descriptive Title of Invention:

Generalized Printhead Model

Name of Project:

DNA Microarray writer v2.7

Product Name or Number:

Was a description of the invention published, or are you planning to publish? If so, the date(s) and publication(s):

No

Was a product including the invention announced, offered for sale, sold, or is such activity proposed? If so, the date(s) and location(s):

No

Was the invention disclosed to anyone outside of AGILENT TECHNOLOGIES, or will such disclosure occur? If so, the date(s) and name(s):

No

If any of the above situations will occur within 3 months, call your IP attorney or the Legal Department now at 1-635-6861 or 970-635-6861.

Was the invention described in a lab book or other record? If so, please identify (lab book #, etc.)

Yes, Lab Book # 2514, page 133.

Was the invention built or tested? If so, the date:

Yes, this model was first implemented in a software application that was first successfully tested on [redacted]

Was this invention made under a government contract? If so, the agency and contract number:

No

Description of Invention: *Please preserve all records of the invention and attach additional pages for the following. Each additional page should be signed and dated by the inventor(s) and witness(es).*

A. Prior solutions and their disadvantages (If available, attach copies of product literature, technical articles, patents, etc.).
B. Problems solved by the invention.
C. Advantages of the invention over what has been done before.
D. Description of the construction and operation of the invention (include appropriate schematic, block, & timing diagrams; drawings; samples; graphs; flowcharts; computer listings; test results; etc.)

Signature of Inventor(s): I (we) hereby submit this disclosure on this date: ([redacted]).

Employee No.	Name	Signature	Telnet	Mailstop	Entity & Lab Name
211183	David R. Adaskin		485-5046	25U-5	BRS R&D
570242	Bill J. Peck		485-2127	25U-7A	BRS R&D
222002	Stanley P. Woods		485-5067	25U-5	BRS R&D
40359	William G. Chesk		485-5037	25U-7A	BRS R&D

(If more than four inventors, include additional information on another copy of this form and attach to this document)

Agilent Technologies

INVENTION DISCLOSURE COMPANY CONFIDENTIAL PAGE 2 OF 6

Signature of Witness(es): *(Please try to obtain the signature of the person(s) to whom invention was first disclosed.)*
The invention was first explained to, and understood by, me (us) on this date: [redacted]

Full Name	Signature	Date of Signature
Guang Chen	Guang Chen	[redacted]
Michael P. Coren	Michael P. Coren	[redacted]

Inventor & Home Address Information: *(If more than four inventors, include addl. information on a copy of this form & attach to this document)*

Inventor's Full Name: **David R. Adaskin**
Street: **1543 Calinoma Dr.**
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Do you have a Residential P.O. Address? P.O. BOX: **No** City: State: Zip:
Greeted as *(nickname, middle name, etc.)*: **Dave** Citizenship: **USA**

Inventor's Full Name: **Bill J. Peck**
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City: **Mountain View** State: **CA** Zip: **94043**
Do you have a Residential P.O. Address? P.O. BOX: **No** City: State: Zip:
Greeted as *(nickname, middle name, etc.)*: **Bill** Citizenship: **Canada**

Inventor's Full Name: **Stanley P. Woods**
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City: **Cupertino** State: **CA** Zip: **95014**
Do you have a Residential P.O. Address? P.O. BOX: **No** City: State: Zip:
Greeted as *(nickname, middle name, etc.)*: **Stan** Citizenship: **USA**

Inventor's Full Name			
William G. Chesk			
Street 1687 Almond Blossom Lane			
City San Jose		State CA	Zip 95124
Do you have a Residential P.O. Address? P.O. BOX No	City	State	Zip
Greeted as *(nickname, middle name, etc.)* Bill	Citizenship USA		

A. Prior solutions: The in-situ DNA Microarray Writers that we have built in the past have used one type of printhead from one vendor. For various reasons we want to explore the possibilities of using different types of printheads, potentially from different vendors. Printhead models differ from each other in many ways, among them: the number of different fluids (ink colors) that can be fired, the spacing of the nozzles, the arrangement of the nozzles, etc. To use other printhead models would require substantial changes to the basic algorithms of the software that controls the Writer.

B. Problems Solved by the Invention: The Generalized Printhead Model provides a basis for writing software that will work with any printhead or group of printheads. The Generalized Printhead Model describes a hierarchy of classes that encapsulate the attributes and behavior of software that controls the printhead in a system that requires precise and repeatable placement of features of several different fluids on the same substrate material.

All the in-situ Microarray Writers that we have worked with use only the Epson printhead. We want to use printheads manufactured by other vendors. Printhead models differ from each other in many ways, number of different fluids ("colors") that can be fired, nozzle spacing, etc. The Version 2.5 Writer is sufficiently complex and sufficiently tied to the design of the Espon printhead so that it is not practical to try to retrofit this software for use with other printheads.

Solution: The Generalized Printhead Model provides a basis for writing code that will work with any configuration of any printhead. It describes a hierarchy of classes that encapsulate the attributes and behavior of software that controls the printhead in a system that requires precise placement of features of several different fluids on a substrate.

There exists in a system exactly one "Printhead Assembly", the aggregation of all printheads on a writer. The Printhead Assembly is made up of one or more "Printhead Groups", each of which can print a complete set of the fluids to be dispensed by the writer. Each Printhead Group is made up of one or more "Printheads", each of which is
can be made to fire at a specific point (the "Trigger Point") along the travel of the substrate. Each Printhead is made up of one or more "Wells", each of which contains exactly one of the fluids to be printed. Each Well is made up of one or more "Nozzle Regions", which are distinct from each other either by their physical separation along one
axis or by the way they are fired. Each Nozzle Region is made up of one or more "Nozzles", which is the smallest addressable unit of the printhead. Each Nozzle may fire one or more drops depending on the nature of the firing signal sent to the printhead.

At each level of this "aggregation hierarchy", each element attributes of cartesian position and angular orientation relative to the first element. Each element at each level knows how to draw itself and to provide drawing context to the elements of the next lower level.

The general method of accomlishing tasks with this set of classes is for an application to invoke a method on the Printhead Assembly objects. This method, then, invokes a similar method on each of the Printhead Group objects, which invoke a similar method on the next level down, and so on, as necessary to complete the task. Depending on the task there may be some processing done at a certain level before or after the invokation of the next level's method.

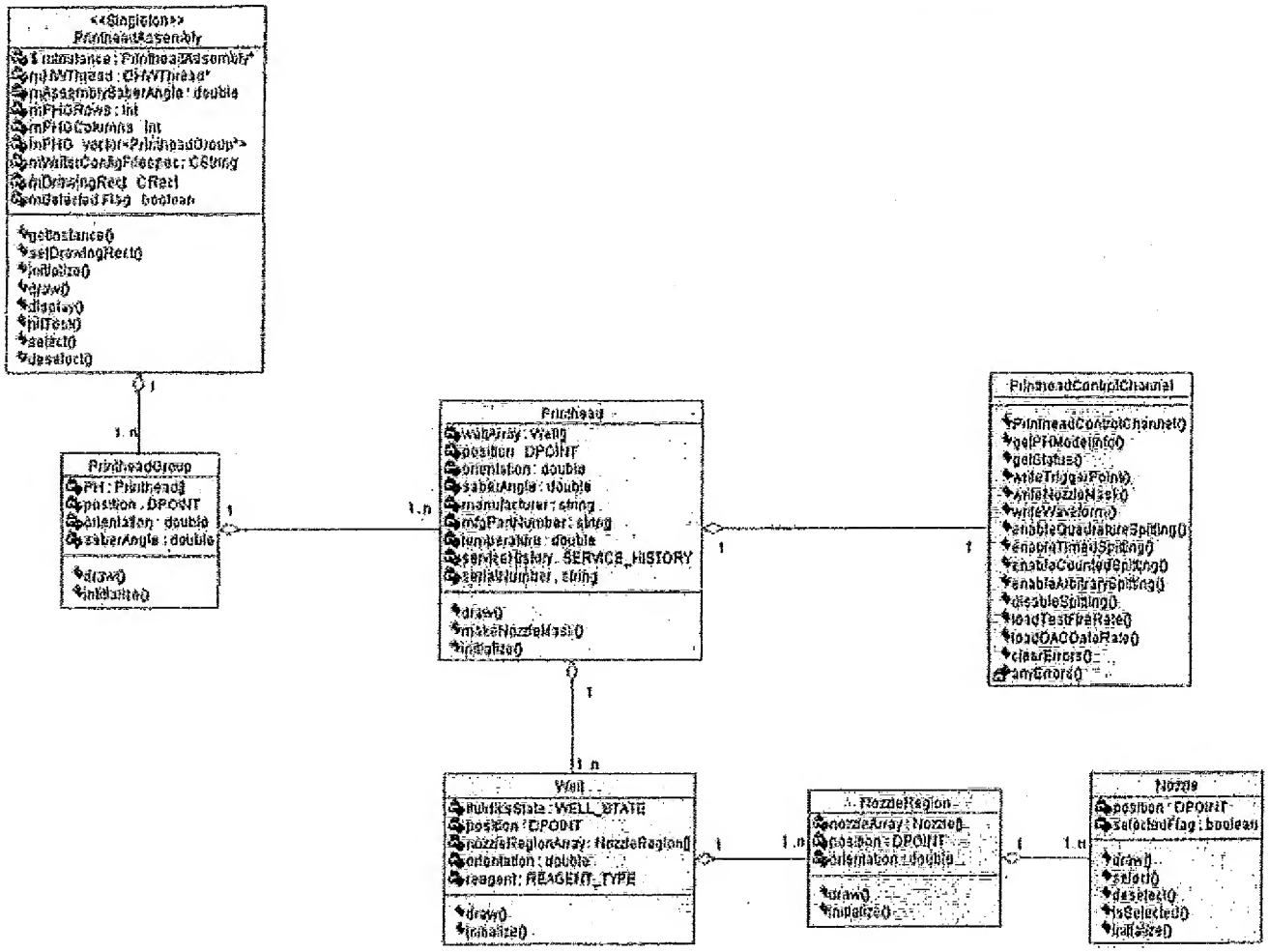
Potential Applications:
Re-use of software for other printing applications. The common element that would make this model useful is the need to print a two-dimensional array of any number of different fluids precisely and repeatably. This model could be applied to applications that use different sets of printheads that vary by number of nozzles, nozzle spacing, number of wells, etc.

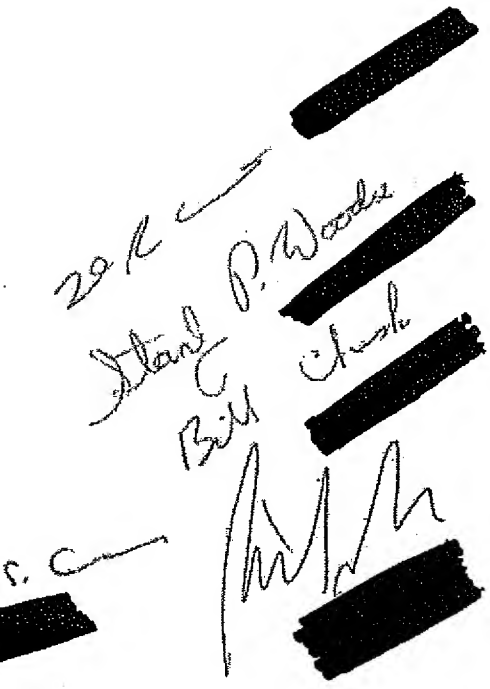
C. Advantages of the invention over what has been done before:

1. Software implemented according to this model can be used with different printheads with minimal modification.
2. Software implemented according to this model can be easily understood by humans other than the implementer, and, thus, is more easily supported.

D. Description of the construction and operation of the invention:

Generalized Printhead Model UML Class Diagram [redacted] David R. Adaskin





[redacted]

4.0 Printhead model

Printhead assemblies vary by:
- type of printheads
- # of printheads
- type of plate
- alignment method

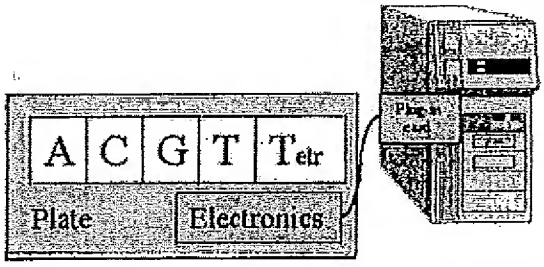
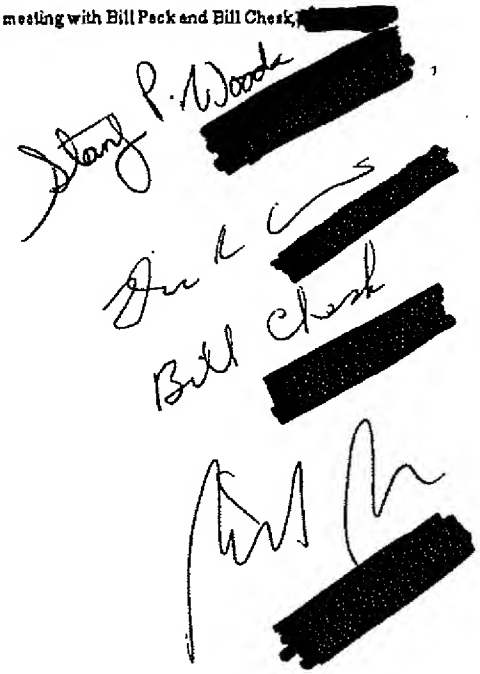
Printheads vary by:
- # of wells/printhead
- # orifices /well
- # rows
- spacing between orifices
- spacing between rows

Assembly data model:
- Serial number
- X,Y,Theta of plate
- Installation date
- Service history

Printhead data model:
- Printhead type
- Serial number
- X position
- Y position
- Z position
- Pitch (nozzle spacing)
- Nozzle map
- Chemistry of each nozzle
- Waveform
- Temperature set point
- Temperature readback
- Installation date
- Service history

When installing a new head:
- Read in configuration information
- Find the best fit
- Report fit to the operator

Open issues:
- Alignment on or off-board the writer cell?
- Self-identification, electronic data sheet?
- Temperature control?



Note: summary of meeting with Bill Peck and Bill Chesk, [redacted]